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REMARKS

Claims 1-24 are pending in this application. Claim 24 is withdrawn from consideration. Claims 1, 2, 5, 6, 8 and 10-12 are rejected under 35 USC 102(b) as being anticipated by, or in the alternative under 35 USC 103(a) as obvious over Cutler. Claims 13-17 and 21-23 are rejected under 35 USC 103(a) as being obvious over Cutler in view of Able. Claims 1-4 and 11 are rejected under 35 USC 102(b) as being anticipated by, or in the alternative under 35 USC 103(a) as obvious over Craig. Claims 1-3, 12, 13, 17 and 23 are rejected under 35 USC 102(b) as being anticipated by, or in the alternative under 35 USC 103(a) as obvious over Able. Claims 4, 11, 18 and 22 are rejected under 35 USC 103(a) as being unpatentable over Able in view of Craig. Claims 7, 9, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The applicants appreciate the indication of allowable subject matter in the application. The pending independent claims are amended herein to limit their scope to this allowed subject matter. New claims are also presented herein to capture additional subject matter that the applicants believe is patentable over the cited prior art, as more fully described below.

Withdrawn claim 24 is cancelled herein. Claims 10 and 24 are also cancelled.

The limitations of allowable claim 7 have been added to independent claim 1 and claim 7 has been cancelled herein, thereby placing claims 1-6 and 8, 9, 11 and 12 into condition for allowance in accordance with the Examiner's findings.

The limitations of allowable claim 20 have been added to independent claim 13 and claim 20 has been cancelled herein, thereby placing claims 13-19, 22 and 23 into condition for allowance in accordance with the Examiner's findings.

New claims 25-29 are added herein.

Independent claim 25 includes the limitation of "providing a mold comprising an outside surface corresponding to a shape of the interior passageway of the gas turbine component" and "affixing a plurality of ceramic insulating tiles to the outside

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surface of the mold" and "mechanically preparing an exposed surface of the tiles to achieve a desired surface profile after the tiles are affixed to the mold so that the mold provides mechanical support for the tiles during the preparing step" and "processing the hybrid structure to a final configuration after the mold has been removed." None of the prior art references, alone or in combination, teaches or suggests such a combination of steps, as described more fully below.

The cited patents to Cutler, Able and Craig all describe processes that are used to form generally planar structures. None of these references recognizes the unique problems associated with forming a structure having a generally tubular shape with a plurality of tiles on the inaccessible inside surface of the interior passageway.

Cutler does use a plurality of ceramic tiles and layers of ceramic matrix composite (CMC) material to form complex-shaped structures, albeit not tubular structures, as described beginning at column 9, lines 22-53. Cutler first uses a mold to consolidate the CMC material into a complex shape, as described at column 9, lines 41-44. In contrast, claim 25 uses the mold-plus-tile structure to form the CMC layer. Cutler then adds tiles to the consolidated CMC material, which is after the mold is removed. In contrast, claim 25 requires the tiles to be applied to the mold before the CMC layer is even formed. Cutler then bonds and crystallizes his combined laminate of CMC and tiles, which is a step that may involve the use of a second mold. However, Cutler fails to describe the claimed step of mechanically preparing an exposed surface of the tiles to achieve a desired surface profile after the tiles are affixed to the mold so that the mold provides mechanical support for the tiles during the preparing step. Cutler never affixes the tiles to a mold, nor does he use the mold to support the tiles prior to their being joined to the CMC layer. Thus, new independent claim 25 and its dependent claims 26 and 27 distinguish over Cutler.

Both Able and Craig form ceramic tiles prior to their being joined to a layer of ceramic matrix composite material. Neither Able nor Craig teaches any step of mechanically preparing an exposed surface of the tiles while using the mold to support the tiles during the preparing step. Thus, new independent claim 25 and its dependent claims 26 and 27 also distinguish over both Able and Craig.

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New independent claim 28 is directed to a method of manufacturing a hybrid structure having a generally tubular shape, and it includes the limitations of "affixing a plurality of ceramic insulating tiles to the outside surface of the mold; at least partially filling gaps between adjacent tiles with a grout material after the tiles are affixed to the mold so that the mold provides mechanical support for the tiles during the grouting step; forming a layer of ceramic matrix composite material over the grouted ceramic tiles..." The Able and Craig references do not describe grouted tile structures. Cutler does describe a grouted tile structure, however, Cutler teaches away from the claimed method by describing a process wherein the tiles are first affixed to the CMC layer and then the grout is applied. The Cutler method would be unworkable for a structure having a generally tubular shape wherein the tiles must be applied on the inside surface of a passageway. Accordingly, claim 28 distinguishes over the cited prior art.

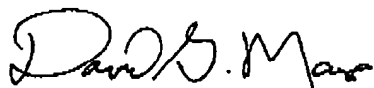
New independent claim 29 is directed to a method of manufacturing a hybrid structure including the steps of "applying a plurality of ceramic tiles to a surface of a mold with gaps between adjacent tiles being left unfilled; applying a layer of ceramic matrix composite material over the ceramic tiles and gaps; drying and at least partially curing the ceramic matrix composite material to bond the tiles and ceramic matrix composite material together, the gaps between adjacent tiles being effective as stress relieving junctions during the drying and curing step; removing the mold; at least partially filling the gaps between adjacent tiles with filler material to form the hybrid structure; and final firing the hybrid structure." None of the cited prior art patents describe this unique order of steps wherein gaps are maintained between tiles during drying and partial firing of an attached CMC layer, and only after the gaps have accommodated the drying and partial firing shrinkage of the CMC layer are the gaps filled. The Able and Craig references do not describe grouted tile structures. Cutler does describe a grouted tile structure, however, Cutler teaches away from the claimed method by describing a process wherein the CMC layers 14 are consolidated prior to attachment of the tiles. (column 9, lines 41-46) Accordingly, claim 29 distinguishes over the cited prior art.

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Reconsideration of the amended application in light of the above Remarks and allowance of claims 1-6, 8, 9, 11-19, 22, 23 and 25-29 are respectfully requested.

Authorization to charge the necessary extra claim fees to the assignee's Deposit Account is contained in the concurrently filed Fee Transmittal form PTO/SB/17.

Respectfully submitted,



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